## (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

## (19) World Intellectual Property Organization International Bureau





(43) International Publication Date 10 February 2005 (10.02.2005)

**PCT** 

## (10) International Publication Number WO 2005/013496 A2

(51) International Patent Classification7:

**H04B** 

(21) International Application Number:

PCT/US2004/023704

(22) International Filing Date:

23 July 2004 (23.07.2004)

(25) Filing Language:

English

(26) Publication Language:

**English** 

(30) Priority Data: 60/489,934

25 July 2003 (25.07.2003) US

- (71) Applicant (for all designated States except US): MEAD-WESTVACO CORPORATION [US/US]; Intellectual Property Counsel, 11101 Johns Hopkins Road, Laurel, MD 20723 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): MARINO, Ronald,

A. [US/US]; 4 Reagan Drive, Jackson, NJ 08527 (US). CAMPERO, Richard, J. [US/US]; 2272 Ballard Way. Ellicott City, MD 21042 (US). CARPENTER, William, Joseph [US/US]; 5603 Strawbridge Terrace, Sykesville. MD 21784 (US).

- (74) Agent: OLIVER, Eric; Dickstein Shapiro Morin & Oshinsky LLP, 2101 L Street NW, Washington, DC 20037-1526 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

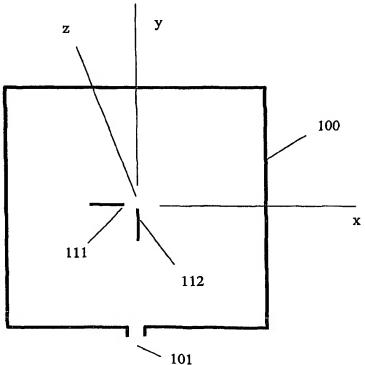
[Continued on next page]

identifying the "dead

The unique antenna

In accordance with an

#### (54) Title: APPARATUS FOR AND METHOD OF USING A DIVERSITY ANTENNA



Reader Antenna in X-Y Plane, Tag in Plane Orthogonal to X-Y Plane (57) Abstract: In accordance with a preferred embodiment of the invention, an antenna structure is provided having one or more antennae arranged so as to read all possible orientations of a randomly placed tag. Also provided in accordance with a preferred embodiment of the invention, is a method of configuring one or more antennae composed of the steps of: zones" of each discrete antennae used, and orienting each antennae such that there are no "dead zones" common to all antennae. structure (and corresponding method) has particular application in tag reader antenna systems for use in RFID (radio frequency identification) applications (13.56 MHz) and the like. exemplary embodiment, multiple RF (radio frequency) antennae are utilized as part of an intelligent station to track items tagged with radio frequency identification (RFID) tags.

# WO 2005/013496 A2



(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

#### Published:

 without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.